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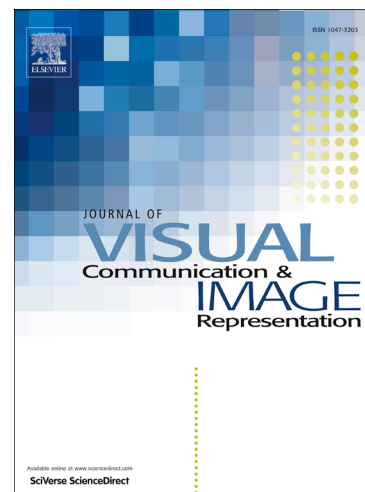
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# A new variational model for joint restoration and segmentation based on the Mumford-Shah model

Qianting Ma <sup>\*</sup> and Dexing Kong <sup>†</sup>

## Abstract

Due to the typical challenges including image noise or blurriness, intensity inhomogeneity or various image modalities, image segmentation is still an open problem. In this paper, a new variational model is proposed for multiphase segmentation of gray and color images corrupted by noise or blur. Based on the aspects of image restoration, the coupled fidelity terms are utilized in order to effectively and robustly tackle images with a high level of noise or blurriness. For intensity inhomogeneous images, we use the bias-corrected fuzzy c-means method to eliminate the effect of bias field before our implementation. A partial result for the energy minimization problem is established. For solving the new variational model, the alternating minimization algorithm is studied. Experiments demonstrate that our method gives excellent results in terms of segmentation quality in comparison with other state-of-the-art segmentation methods.

**Key words and phrases:** Image Segmentation, Image Restoration, Mumford-Shah Model.

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